Remarks

Claims 1-20 are pending in the present Application. Claims 1 and 9 are amended above to better clarify the claimed invention.

No new matter is introduced herein.

Claim Rejections – 35 USC § 102

Claims 1-20 stand rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent Application Publication No. 2004/0117037 to Hinshaw et al. (hereinafter "Hinshaw"). For the reasons stated below, Applicant respectfully submits that this rejection does not apply to the claims as amended herein.

Hinshaw describes an asymmetric streaming record data processing method and apparatus with host computers and job processing units (JPU) coupled together as nodes on a network. (See, e.g., Abstract). As described in Hinshaw, each JPU comprises a memory, a central processing unit (CPU) and a programmable streaming data processor (PSDP) specifically adapted for processing record-oriented data by filtering. (See, e.g., Fig. 2 and ¶[0336]). The PSDP functions as a disk controller and as a coprocessor or hardware accelerator for the JPU. (See, ¶[0333]). During disk read operations, the PSDP filters the data it is reading, whereby less data ends up in the JPU's memory, leaving the CPU free for more complex tasks such as sorting. (See, ¶[0341]). As such, each of Hinshaw's JPUs has two processors: the PSDP and the CPU.

Independent claims 1 and 9 make clear that the same processor is used in executing both the first and the second search steps, wherein the second search step uses the available computational power of the processor which is remaining from the first search step, as disclosed in the specification at page 6, lines 13-16, and page 7, lines 19-21. As such, the claimed invention solves the problem of timely searching, with limited processing power so as to allow the use of a single processor, a database on a disk storage medium by using task management and prioritization of the search and reading-in tasks: more specifically, by executing with the processor a first search step, the first search step including reading-in disk sectors of the disk storage medium and searching database records stored in said disk sectors read-in, wherein the searching is performed with a search depth dependent on an available computational power of the processor and matched to a speed of the reading-in of disk sectors such

that the reading-in of disk sectors is not interrupted, providing an intermediate result from the first search step, and executing with the processor a second search step in the intermediate result from the first search step, wherein executing the second search step uses the available computational power of the processor which is remaining from executing the first search step.

As previously argued, Hinshaw takes a different approach. By contrast to the claimed invention, Hinshaw attempts to avoid the interference of complex search tasks with disk read operations by providing separate and independent processing units for complex search and read-in. Hinshaw teaches the use of a dedicated streaming data processor for execution of disk read operations so that a CPU executing complex search tasks is not burdened and does not burden disk read operations. In other words, instead of trying to solve the problem by more judicious use of a single processor, Hinshaw simply throws more processors at the problem. Such a solution may not be suitable for many applications.

In response to Applicant's arguments, the Examiner argues that Hinshaw teaches the inclusion of a PSDP and a CPU on "a single chip or in a single package" and that this teaches the use of a single "processor." Hinshaw states in relevant part:

> [0041] In one embodiment, each JPU also has a special purpose programmable processor, referred to herein as a Programmable Streaming Data Processor (PSDP). The PSDP acts as an interface between the CPU of a JPU and storage controller and/or the mass storage device. *The PRSP [sic] is a processor that is distinct from the more general purpose CPU in each JPU. It is also distinct from the CPUs of the host computers in the first group.* [0042] The PSDP can be implemented as a Field Programmable Gate Array (FPGA), as in the preferred embodiment, or as an Application-Specific Integrated Circuit (ASIC), a fully-custom Application Specific Standard Product (ASSP), or even as discrete logic on a printed-circuit board. It can also be included in an integrated processor (i.e., a CPU that includes peripheral interface logic) on a single chip or in a single package, or it could be included with the circuitry of the mass storage device.

The Examiner also points to the recitation in claim 1 of Hinshaw of an:

> asymmetric data processor comprising: one or more host computers, each including a memory, a network interface and at least one CPU, …; one or more Job Processing Units (JPUs), each having a memory, a network interface, one or more storage devices, and at least one CPU …"

The excerpts of Hinshaw upon which the Examiner relies cannot be read in isolation. As made clear in ¶[0041] of Hinshaw cited above, "[t]he PRSP is a

processor distinct from the more general purpose CPU in each JPU." That is, even assumed arguendo ¶[0042] of Hinshaw suggests that the PSDP is included as peripheral interface logic in an integrated processor further including a CPU used as said general purpose CPU of the JPU, the PSDP remains a logic distinct from the CPU's logic. In other words, Hinshaw's JPUs always comprise two distinct processing units, 1) a PSDP and 2) a CPU, whether realized in an integrated circuit or not. The computational power of the CPU that includes peripheral interface logic, as mentioned in ¶[0042], is the computational power of the CPU plus the computational power of the peripheral interface logic. Hinshaw does not teach executing both search steps with the same processor but with a combination of at least one CPU and a PDSP. Moreover, implementing a PSDP and a CPU on a single chip does not transform these two independently operating processors into a single processor.

To more clearly distinguish the claimed invention from Hinshaw, claim 1 has been amended above to recite that, in the first search step, "the searching is performed with a search depth dependent on an available computational power of the processor and matched to a speed of the reading-in of disk sectors". Further, amended claim 1 now recites that "the second search step uses the available computational power of the processor which is remaining from executing the first search step."

According to Hinshaw, the PSDP interfaces a standard disk to a peripheral bus with the basic function of allowing a CPU to read and write the disk ([0335]). The PSDP also provides programmable hardware directly in the disk read path, to and from the controller. This portion of the PSDP hardware is called a "filter" unit ([0336]). The filter unit can perform operations at the same rate as data is supplied by the disk. This leaves the CPU free for more complex tasks such as sorting ([0341]). Thus, the complexity of operations possible to implement on Hinshaw's filter unit is dependent on the complexity of the filter unit but not on the currently available computational power of the integrated circuit in which the PSDP can also be included.

Hinshaw teaches more complex processing to proceed in parallel to field level filtering ([0072]), but such more complex processing does not use the currently available computational power of the integrated circuit which is remaining from the filtering.

For the aforementioned reasons, therefore, Applicant respectfully asserts that independent claims 1 and 9 are not anticipated by Hinshaw. As such, claims 2-8 and 10-20, which depend therefrom and recite additional limitations, are likewise not

anticipated by Hinshaw, for at least the reasons stated above. The rejection of claims 1-20 under 35 U.S.C. § 102(e) should therefore be withdrawn.

Additionally, with respect to dependent claims 8 and 16, Applicant respectfully disagrees that Hinshaw teaches that "the disk storage medium is an optical disk." In fact, no where does Hinshaw mention optical storage media and only refers to hard disk drives. (¶[0010].) This is not simply a matter of design choice. As discussed in the Specification of the present Application:

> Currently, however, dynamic databases are not stored on optical media. The reason for this is the relatively long skip times for the limited number of rewrite cycles on an optical medium in comparison with a hard disk. Complex search queries are therefore very time consuming on optical media. (Specification, page 1, lines 16-22.)

Thus, unlike the claimed invention which addresses the problem of long skip times associated with optical disks, Hinshaw does not. Thus, for this additional reason, Hinshaw does not anticipate dependent claims 8 and 16.

Conclusion

In view of the amendments and remarks presented herein, Applicant respectfully asserts that all pending claims, claims 1-20, are in condition for alowance. Prompt consideration and advancement of the present application to allowance are earnestly solicited. If there remain any outstanding issues, the Examiner is urged to contact the undersigned.

No fee is believed to have been incurred by virtue of this amendment. However if a fee is incurred on the basis of this amendment, please charge such fee against deposit account 07-0832.

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